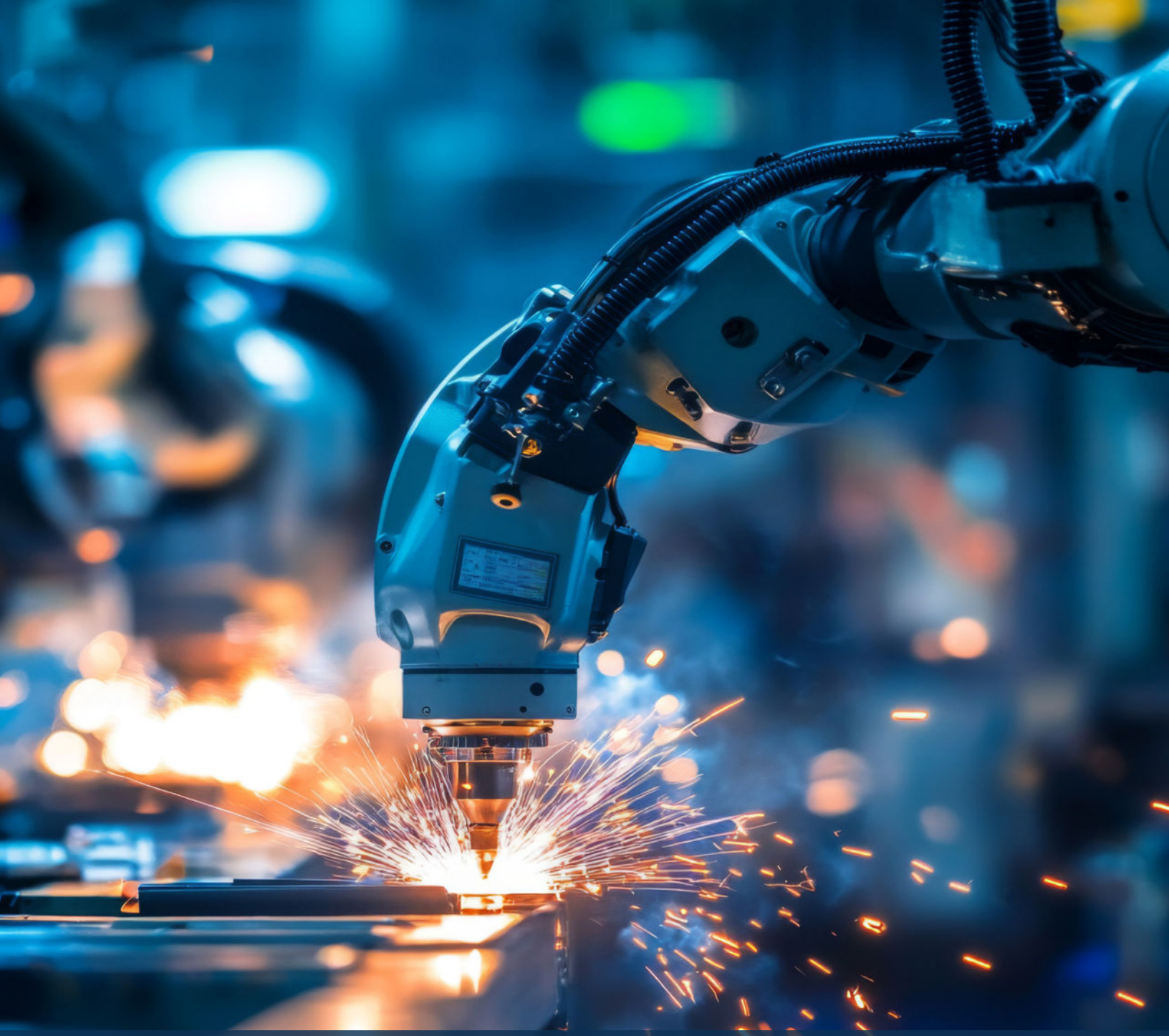

Assess and Improve Manufacturing Maintenance to Maximize Uptime

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Operations leadership often considers equipment maintenance to be a cost center. But if a manufacturing plant executes maintenance effectively, the site will achieve better productivity, costs, safety, and staff retention.

The reality is that manufacturing leaders can get stuck in a break-fix model. **Recent research**[1] found that 57% of facilities default to run-to-failure programs. They're too busy fighting fires to uncover ways to fireproof the building. However, taking the time to assess, implement, and improve maintenance programs can yield powerful benefits. Consider that unplanned downtime costs an average of **11% of revenue** at the world's largest companies[2]. Aging equipment and mechanical failure are the **leading causes** of downtime[3]. Proactive, data-driven strategies minimize downtime, maximize asset performance, and reduce the cost of parts, equipment, and overtime.

Assess Your Maintenance Maturity

A structured assessment helps organizations understand their practices across every dimension of maintenance management. Once you understand the organization's strengths and weaknesses, you can identify opportunities for improvement. You can view the assessment as a scorecard and use it as strategic tool to drive ongoing conversations and make decisions.

Understanding a quantifiable baseline across multiple dimensions lets you prioritize initiatives based on data rather than intuition. It also helps ensure resources—both people and dollars—are allocated where they will have the most impact. And you can invest more wisely in training and technology, which in turn supports better scheduling, reporting, and risk mitigation.

A structured approach to maintenance also helps to foster alignment across departments. Clearly defining roles, responsibilities, and expectations allows teams to work more cohesively, which is crucial for sustaining improvements and embedding a culture of continuous improvement.

Organizations can set realistic goals, track progress, and celebrate milestones. Each step forward contributes to a more resilient and efficient operation.

Several Ounces of Prevention

When a food and beverage company bought a plant, it was able to retrofit some existing equipment and move some equipment from other facilities. The company had unmet demand, so they wanted to get up to speed quickly. They engaged IPM to document the assets and their associated preventive maintenance tasks (PMs), spare parts, and material costs. IPM identified all the pieces, old and new, and dug up materials and records wherever they could find them. The team provided all the necessary data to upload to the CMMS. Importantly, IPM pointed out critical risk areas, such as a conveyor that has a history of being unreliable and ages quickly, and recommended what to watch for to prevent problems. When the plant is fully functional, IPM will return to make sure the CMMS matches what actually happens.

1 "The State of Industrial Maintenance 2024," www.getmaintainx.com.

2 "The True Cost of Downtime 2024," www.siemens.com.

3 "CFE Media and Technology Industrial Maintenance Report," www.advancedtech.com (March 2020).

10 Dimensions of the Maintenance Model

Based on working with multiple manufacturers over the years, Integrated Project Management Company (IPM) recommends that you assess and strengthen 10 key components. These include traditional themes you'd find in Society for Maintenance & Reliability Professionals (SMRP) and Total Productive Maintenance (TPM) models. They also include digital integration dimensions. The intention is to reflect a holistic view of maintenance as both a business system and a shop-floor practice.

1. ***Organization:*** There are enough staff who can effectively execute equipment maintenance, and their roles and responsibilities are defined.
2. ***IT systems:*** Digital tools hold information on equipment and parts, help schedule work and resources, and support maintenance management and reporting. These tools run the gamut from spreadsheets to integrated enterprise asset management (EAM), computerized maintenance management systems (CMMS), and enterprise resource planning (ERP) systems with predictive analytics.
3. ***Parts management:*** Parts requirements for critical equipment are identified, you have the parts and consumables needed for equipment maintenance, and they're managed cost effectively.
4. ***Planning and scheduling:*** You have master plans and weekly and daily schedules for preventive maintenance activities.
5. ***Preventive maintenance:*** There are equipment maintenance requirements and plans for critical equipment. Condition monitoring systems and reliability analysis methods enable predictive maintenance.
6. ***Work management:*** You convert equipment maintenance requirements into work orders, then track each to closure. There are processes to monitor quality and manage and minimize work-order backlogs.
7. ***Autonomous maintenance:*** Operations personnel understand their responsibility and standards for equipment care and have the skills to do it. This may include detecting and reporting problems.

Stay Up to Date

IPM worked with a food and beverage manufacturer that implemented a CMMS 10 years ago. Since then, the plant replaced assets and installed new lines, but they didn't update the system. Over time, they moved more and more toward reactive maintenance. Downtime increased and production decreased. Collaborating with the maintenance leads, IPM identified the equipment, analyzed the manuals, and wrote descriptive preventive maintenance procedures. Crucially, the IPM consultant developed standard operating procedures for updating the CMMS when assets are added or removed, including who is responsible. This work will provide more line hours for the plant to run critical lines.

8. ***Workplace management:*** Work areas are clean and organized; tools and materials are close and easily accessible; and signs or charts inform staff of status or needs.
9. ***Cost controls:*** You record maintenance costs for each work order and track costs for each asset as well as consumables. And you identify and act on budget variances.
10. ***Skills development:*** Critical skills have been identified, training and coaching are in place, and maintenance staff have achieved those skills.

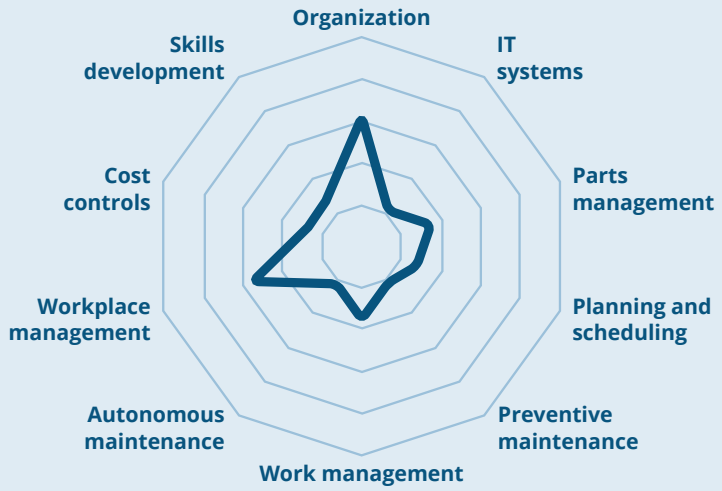
IPM rates each dimension on a 5-point scale: inconsistent, basic, competent, advanced, best in class. Then the results are mapped on a spiderweb or radar chart to easily visualize strengths, weaknesses, and imbalances. (See the sidebar, "Maintenance Maturity Self-Assessment," on Page 4 for an example.)

Maintenance Maturity Self-Assessment

Rate each element under the 10 dimensions on a scale of 1 to 5:

1 inconsistent
2 basic
3 competent
4 advanced
5 best in class

Average the elements for each dimension. Plot the figures on a radar or spiderweb chart, like the example shown here.



1. Organization (average rating: _____)

1 2 3 4 5 There are defined roles and responsibilities for planning and executing equipment maintenance

1 2 3 4 5 The organization has staff to execute equipment maintenance

1 2 3 4 5 The organization is effective in executing equipment maintenance

2. IT systems (average rating: _____)

1 2 3 4 5 IT systems effectively capture and hold equipment and spare parts information

1 2 3 4 5 IT systems effectively support work scheduling and resource assignments

1 2 3 4 5 IT systems effectively support equipment maintenance management and reporting

3. Parts management (average rating: _____)

1 2 3 4 5 Parts requirements for critical equipment are identified

1 2 3 4 5 Parts and materials are adequate to accomplish equipment maintenance

1 2 3 4 5 Parts and materials are managed cost effectively

4. Planning and scheduling (average rating: _____)

1 2 3 4 5 There are established master plans for preventive maintenance

1 2 3 4 5 There are weekly schedules for preventive maintenance

1 2 3 4 5 There are daily schedules for maintenance activities

5. Preventive maintenance (average rating: _____)

1 2 3 4 5 There are planned equipment maintenance requirements for all items of critical equipment

1 2 3 4 5 Condition monitoring systems are used to develop planned maintenance requirements

1 2 3 4 5 Reliability analysis methods are used to develop preventive maintenance requirements

6. Work management (average rating: _____)

1 2 3 4 5 Equipment maintenance requirements are converted into work orders and tracked to closure

1 2 3 4 5 Work order completion is managed to minimize the backlog of open work orders

1 2 3 4 5 The quality of work orders is managed to minimize the need for repeat work orders

7. Autonomous maintenance (average rating: _____)

1 2 3 4 5 There are standards for equipment care by operations personnel

1 2 3 4 5 Roles for equipment care are clearly defined

1 2 3 4 5 Critical skills for equipment care are developed through training and coaching

8. Workplace management (average rating: _____)

1 2 3 4 5 Work areas are clean and arranged for efficient work by maintenance personnel

1 2 3 4 5 Tools and materials are close to hand and easily accessible to maintenance personnel

1 2 3 4 5 Visual management tools keep staff informed and capture lessons requiring attention

9. Cost controls (average rating: _____)

1 2 3 4 5 Equipment maintenance costs are recorded for individual work orders

1 2 3 4 5 Historical costs of equipment maintenance for individual eqiupment items are tracked

1 2 3 4 5 Variances between budgeted and actual costs are identified and acted upon

10. Skills development (average rating: _____)

1 2 3 4 5 Critical maintenance skills have been identified

1 2 3 4 5 There are opportunities for increasing skill levels through training and coaching

1 2 3 4 5 Skills for equipment maintenance personnel have been certified

How to Use the Model to Improve Maintenance Maturity

First, it may be helpful to refine the dimensions to match your organization's strategy, language, and culture. When people look at the chart, they should understand it readily, without having to learn new terms or concepts.

Position it as a decision-making tool rather than just a scorecard or audit. It's human nature to become defensive when results sound like criticism. Instead, you might ask for validation: Is this where we are? What makes us advanced in this area? Where do we want to go?

Similarly, don't be tempted to aim for world-class ratings on every element, at least not at once. Trying to improve on more than two or three dimensions would lead to fatigue. Start with improvements that will have the greatest impact by reducing costs and advancing the strategy.

For example, if many areas are level 1, or inconsistent, you might work toward stabilization and start with ensuring all dimensions are at least level 2. If you're focused on reliability, you might prioritize preventive maintenance (perhaps by implementing condition monitoring systems) and work management (by converting routine maintenance into work orders and tracking completion). A highly automated site might put more weight on IT systems (invest in or optimize a computerized maintenance management system). A labor-intensive site might focus first on skills development and autonomous maintenance.

Finally, celebrate successes, but don't update the model constantly. Revisiting it once or twice a year will ensure it's visible and you can show progress. Refreshing it more often may turn it into a chore, and the fundamental elements are more likely to get lost.

A Place for Everything & Everything in its Place

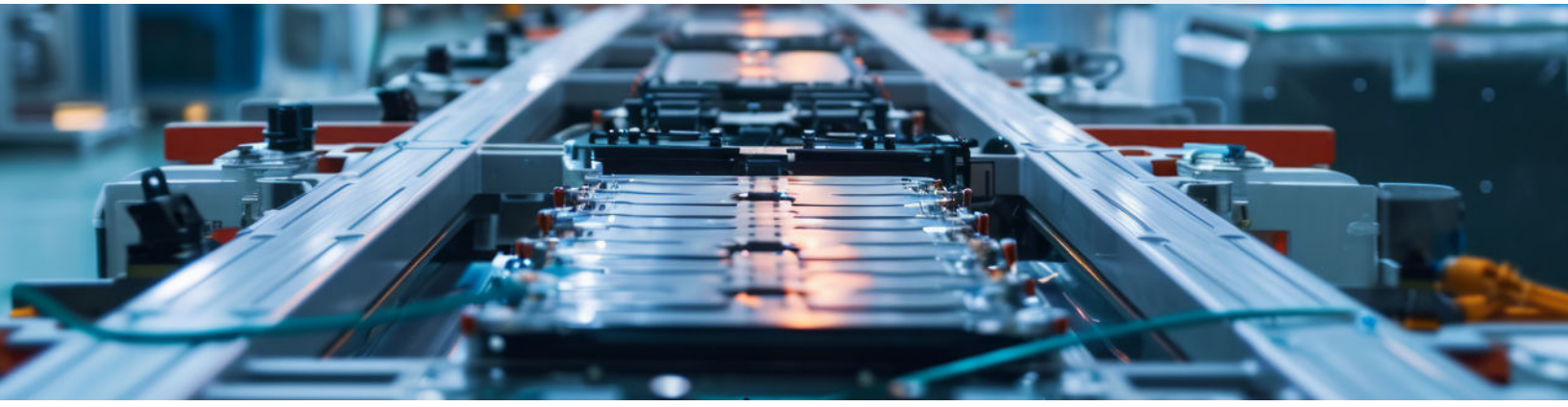
As part of a large operations improvement project with an industrial products company, IPM assessed the maintenance program. The consultant learned that there were $2.5 million worth of spare parts and assets that they couldn't find. The parts were received and signed for, but not tracked. Were they used? Shipped to a different location? IPM worked with the facilities to find the parts and revise the digital and physical parts inventory system. This improvement will prevent the site from wasting technical resources' time looking for lost parts, as well as prevent ordering additional parts due to poor organization.

Staffing Up to Drive Costs Down

The small maintenance team at an industrial plant was working overtime and constantly in break-fix mode. Labor costs and downtime were eating into margins. IPM recommended that they hire a clerk to handle inventory, parts, and small cleaning tasks. This would enable the highly qualified maintenance crew to focus on preventive maintenance and increase wrench time. Despite the additional headcount, the conservative savings estimate was $112,000, due to less overtime and downtime, and the ability to complete more preventive maintenance to improve equipment up time.

In Stock, No Waiting

An industrial products manufacturer expanded its facility and, as a preventive measure, asked IPM to identify failure points in the new line. Consultants walked the floor to document potential problems and prioritized four areas to focus on. They collected manuals, drawings, and bills of materials to identify the critical parts that the plant should keep in stock. In the past, it often had to wait weeks for delivery from overseas. With the critical parts on hand—and quantities up to date in the SAP—the facility will reduce downtime.



CASE STUDY

Finding Pockets of Opportunity in Maintenance Protocols

A large food and beverage manufacturer had excessive downtime that was eroding margins. The company recognized that it had a break-fix culture, but it didn't have the experience and resources to determine how to address it. It engaged IPM to assess its maintenance practices and identify ways to improve and save costs.

IPM's consultant observed plant operations and the little historical information available. He assessed maintenance maturity on the 10 dimensions described in this article, determined gaps, and recommended improvements.

MISSING PIECES

The company didn't have formal preventive maintenance and parts management programs, and record-keeping was inconsistent. They often flew in vendor technical support for emergency equipment breakdowns that could have been prevented. Unbudgeted repairs and purchases meant higher costs, and unscheduled downtime led to increased overtime.

IPM created value stream maps and documented process steps. Classifying tasks as value added, necessary non-value added, or non-value added revealed that 8 percent of time was spent on non-value-added tasks (for example, filling out a form that someone else would later key into a spreadsheet).

ROOM FOR IMPROVEMENT

The consultant engaged site leadership and mechanics to validate findings and identify improvement opportunities. Recommendations included storing cleaning and lubrication supplies, replacement parts, and tools close to the associated equipment , rather than keeping everything in a centralized storage area. Scheduling preventive maintenance on the weekends would decrease downtime—and breakdowns.

IPM recommended implementing a computerized maintenance management system (CMMS) system for advanced planning techniques (evaluating workload priorities 24 hours prior to shift start, dynamic rescheduling of labor and assets) and execution (manage emergent work, configure and manage data, part cross checks and validations). All told, the project identified about $455,000 in annualized cost savings.

ON THE ROAD TO MAINTENANCE MATURITY

Importantly, working with plant management, IPM delivered a roadmap starting with immediate and impactful actions. Retraining the team on the existing enterprise asset management (EAM) and enforcing discipline would lay a consistent foundation without significant costs. Daily assignments tracked through completion would prevent delays and backlogs. Longer-term steps include investing in an advanced CMMS and hiring a full-time spare parts clerk.